

TYLERIUS, A NEW GENERIC NAME
FOR THE INDO-PACIFIC PUFFERFISH,
SPHEROIDES SPINOSISSIMUS REGAN, 1908
(TETRAODONTIFORMES: TETRAODONTIDAE)
AND COMPARISONS WITH
AMBLYRHYNCHOTES (BIBRON) DUMÉRIL

Graham S. Hardy

ABSTRACT

Tylerius new genus, is proposed for *Spheroides spinosissimus* Regan. It is distinguished from other tetraodontids by the following combination of characters: nasal papilla with two nostrils; dorsal eye rim only adnate; no ventrolateral skinfold; well developed upper and lower lateral lines extending along body to caudal fin base. A new diagnosis is given for *Amblyrhynchotes* (Bibron) Duméril, to which *Tylerius* is closely related. The two genera differ in skull osteology, particularly in the ethmoid-frontal-parasphenoid region, and also in a number of external morphological features.

Spheroides spinosissimus Regan is a poorly known, Indo-Pacific species, first described from a single specimen taken from Saya de Malha Bank in the Indian Ocean. It has recently been redescribed by Hardy (1981a), who referred the species to *Amblyrhynchotes*, following Fraser-Brunner (1943), Smith (1961) and others. However, further examination of specimens, including detailed osteological comparisons, has now made a reconsideration of the generic status of *spinosissimus* necessary. In addition, the restriction of *Amblyrhynchotes* to a single species (*A. honckenii*), in several recent papers (see below), has enabled a more refined diagnosis to be given for that genus.

METHODS

For comparison of osteology, one example of each species was cleared, alizarin-stained and stored in glycerine. Conventional potassium hydroxide techniques were used. Several other examples were radiographed for vertebral counts. Illustrations were prepared using a camera lucida.

Abbreviations of specimen repositories are as follows: BMNH—British Museum (Natural History), London; NMNZ—National Museum of New Zealand, Wellington; WAM—Western Australian Museum, Perth.

Specimens Examined.—*Amblyrhynchotes honckenii*. Simon's Bay, BMNH 1879.5.14.377; Algoa Bay, BMNH 1895.12.27.9-10; Buffalo R., BMNH 1908.12.28.119-121; Great Fish Point, Cape of Good Hope, BMNH 1930.9.30.37; Simonstown Dock, Cape Discovery, BMNH 1935.5.2.188-9 cleaned and stained. *Tylerius spinosissimus*. Saya de Malha Bank, Indian Ocean, BMNH 1908.3.23.299 (Holotype of *Spheroides spinosissimus* Regan); Browse I., Western Australia, WAM P. 25401-016; Indian Ocean, off Western Australia, NMNZ P. 10842, 10843 (2 specimens—1 cleared and stained), WAM P. 26209-018 (3 specimens); Atlas Strait, off Sumbawa I., Indonesia, NMNZ P. 13186 (2 specimens).

SYSTEMATICS

Ongoing studies have shown that the five species¹ included by Fraser-Brunner (1943) in *Amblyrhynchotes* in fact represent four different genera, *Amblyrhynchotes* retaining only *A. honckenii* (Bloch). *Tetrodon richiei* Freminville has been redescribed and included in *Contusus* Whitley by Hardy (1981b), and *Tetraodon hypselogoneion* Bleeker is now referred to *Torquigener* Whitley (Hardy, 1983a;

¹ Tyler (1980) referred *Torquigener piosae* Whitley to *Amblyrhynchotes*, but this species has been recently transferred to *Polyspina* Hardy.

b). Recent examination of the holotype of *Tetrodon brevipinnis* Regan has shown it to be congeneric with *hypselogeneion*. *Spheroides spinosissimus* Regan differs in many regards from *A. honckenii* (see comparisons below), and can be accommodated neither in *Tetraodon* (see Dekkers, 1975, for description of *Tetraodon*), to which it was referred by Annandale and Jenkins (1910) and Barnard (1927), nor in other more closely related genera. Consequently, the new generic name *Tylerius* is proposed for *Spheroides spinosissimus* Regan.

Tylerius new genus

Type Species.—*Spheroides spinosissimus* Regan.

Diagnosis.—Tetraodontid fishes of robust form, somewhat squarish in cross-section; snout short with dorsal surface dropping abruptly anterior to eye; nasal organ a short papilla with two nostrils; eye dorsally adnate only; ventro-lateral skinfold absent; small spines moderately dense on body, extend well onto caudal peduncle; upper and lower lateral lines on body, extending to caudal fin base. Frontals broad across interorbit, almost completely covering dorsal surface of ethmoid; prefrontal strongly down-curved.

Description.—A full description of *T. spinosissimus* is given by Hardy (1981a).

Etymology.—*Tylerius* is named for Dr. J. C. Tyler, in recognition of his very considerable contributions to our knowledge of the classification of plectognath fishes.

Amblyrhynchotes (Bibron) Duméril

Type Species.—*Tetrodon honckenii* Bloch, by subsequent designation (Fraser-Brunner, 1943).

Diagnosis.—Tetraodontid fishes of robust form, somewhat squarish in cross-section; snout shallowly sloped to anterodorsally positioned mouth; nasal organ a short papilla with two nostrils; eye dorsally adnate only; ventrolateral skinfold present; small spines predominantly on dorsum and ventrum; very small, papilla-associated spines following the upper and lower lateral lines on caudal peduncle. Frontals broad across interorbit, ending anteriorly level with lateral flanges of prefrontals; dorsal surface of ethmoid greatly exposed; prefrontals laterally spade-like and flattened, extending well below base of parasphenoid; parasphenoid in broad contact with frontal.

COMPARISON OF *TYLERIUS*, *AMBLYRHYNCHOTES* AND RELATED GENERA

The majority of genera related to *Tylerius* have been described or redescribed in recent works; *Colomesus* by Tyler (1964); *Sphoeroides* by Shipp (1974); *Contusus* by Hardy (1981b); *Marilyna* and *Reicheltia* by Hardy (1982); *Fugu*, *Torquigener*, *Tetractenos* and *Polyspina* by Hardy (1983a). In addition, comparisons with *Amblyrhynchotes* have been made by Hardy (1981b; 1983a). The above genera can be separated into two distinct categories; those with the eye rim completely adnate, and those with only the dorsal rim of the eye adnate. Of the latter, only *Sphoeroides* (sometimes, Tyler, 1980) and *Tylerius* lack a ventrolateral skinfold. Tyler's (1980) observation that the occurrence or not of a ventrolateral skinfold is of very limited systematic interest, resulted from studies of species undeservedly accorded congeneric status, thus obscuring a number of useful generic characteristics. I have found that presence or absence of a ventrolateral skinfold, and also eye rim condition are very stable and useful generic characters

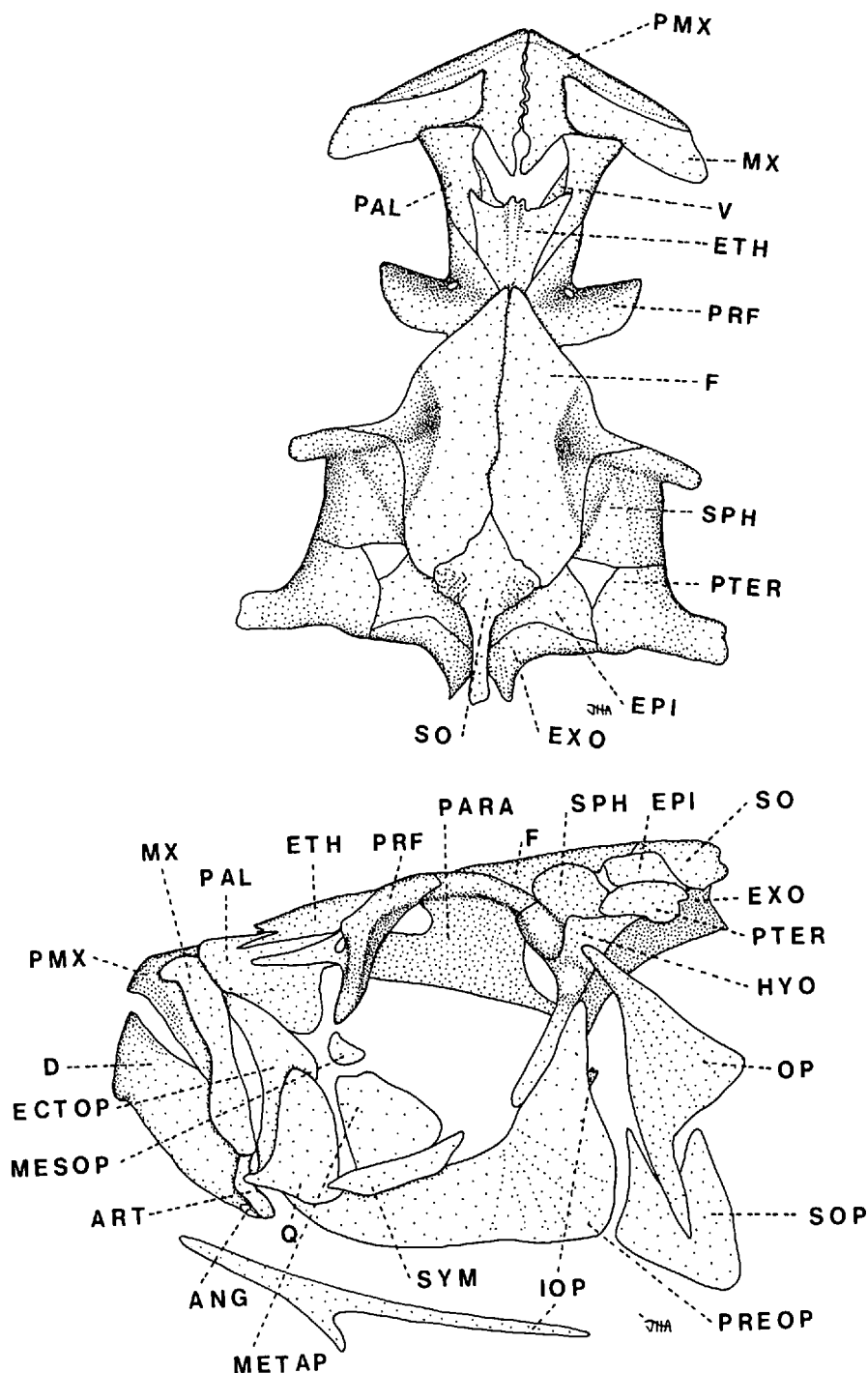


Figure 1. *Amblyrhynchotes honckenii*. Dorsal and lateral views (skull length 42 mm). Abbreviations: ANG—angular; ART—articular; D—dentary; ECTOP—ectopterygoid; EPI—epiotic; ETH—ethmoid; EXO—exoccipital; F—frontal; HYO—hyomandibular; IOP—interoperculum; MESOP—mesopterygoid; METAP—metapterygoid; MX—maxillary; OP—operculum; PAL—palatine; PARA—parasphenoid; PMX—premaxillary; PREOP—preoperculum; PRF—prefrontal; PTER—pterotic; Q—quadrate; SO—supraoccipital; SOP—suboperculum; SPH—sphenotic; SYM—symplectic; V—vomer.

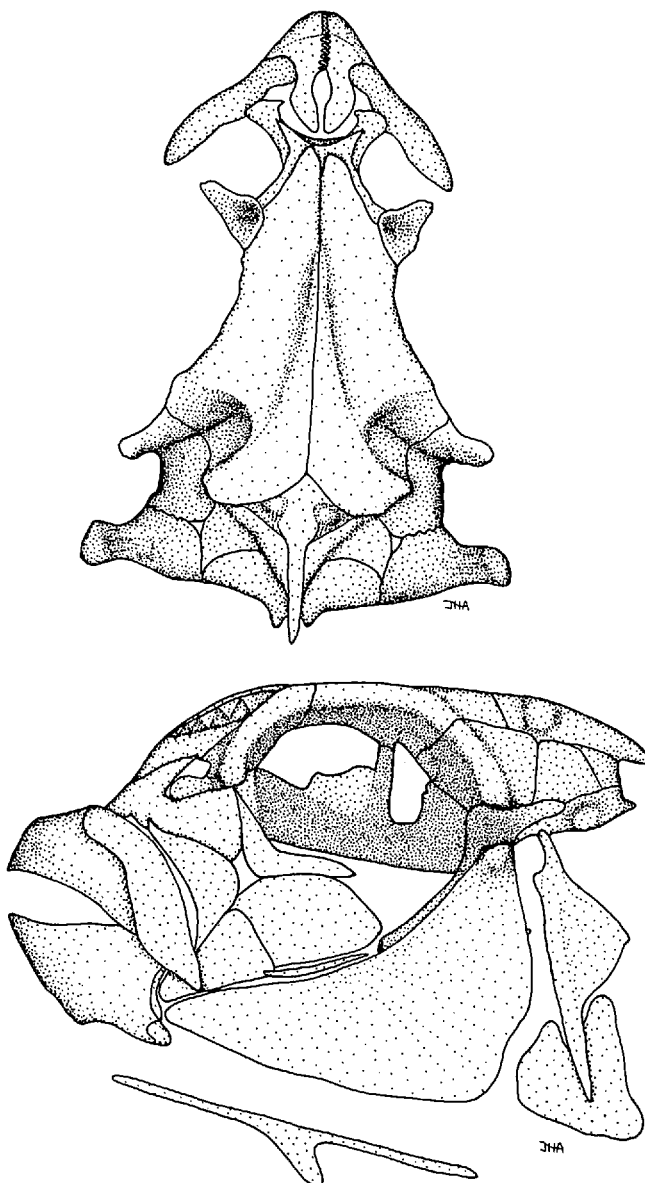


Figure 2. *Tylerius spinosissimus*. Dorsal and lateral views (skull length 33 mm).

for those tetraodontids with an upraised nasal organ with two separate nostril openings.

Tylerius is distinguished from *Sphoeroides* in having a well-developed lower lateral line, compared with the traces (at best), found in the latter (Tyler, 1980). Furthermore, the snout in *Sphoeroides* is elongate and moderately straight (see illustrations in Shipp, 1974), except in *S. pachygaster*, which has the snout broadly rounded. This contrasts markedly with the abruptly down-curved snout in *Tylerius*. The extremes of skull structure seen in *Sphoeroides* were illustrated by

Tyler (1980, fig. 258A—*S. dorsalis* and fig. 261—*S. annulatus*), who noted that other *Sphoeroides* species form an almost continuous series of intermediate conditions. In all species illustrated, however, the ethmoid, whether narrow or relatively broad, is well exposed dorsally, unlike that in *Tylerius*.

The remaining discussion emphasizes comparison of *Tylerius* with *Amblyrhynchotes*, in order to further establish distinguishing criteria for the two genera. Both are somewhat heavily bodied fishes, and squarish in cross-section. The dorsal surface of the snout of *Amblyrhynchotes* is shallowly sloped to the anterodorsally oriented mouth, in contrast with *Tylerius* which further has the mouth anteriorly positioned, the usual tetraodontid situation. The eye is relatively smaller and more highly positioned on the head in *Amblyrhynchotes*, and a chin is present in that species only. Upper and lower lateral lines occur on the body in both genera, those in *Amblyrhynchotes* having small, associated papillae posterior to the caudal peduncle. A ventrolateral skinfold is present in *Amblyrhynchotes* only, and the fins are more fleshy in that genus.

Small body spines are associated with small papillae or lappets in both genera, the lappets in *Amblyrhynchotes* being very obvious. In *Amblyrhynchotes* the spines are restricted mainly to the dorsum, extending from between the eyes to somewhat before the dorsal fin and to the ventrum, from the level of the eyes to just before the vent. Examination of a cleared and alizarin-stained skin showed spines to be absent from the upper cheek and from a broad region behind the eye to the branchial aperture. They occurred on the side of the body behind the pectoral fin only in a very narrow band, some four to five spines wide. Very small spines follow the length of the lateral lines on the caudal peduncle, being associated with the papillae described above. This feature has now been recorded from several genera, including *Fugu* (Cheng et al., 1975), *Polyspina* and *Torquigener* (Hardy, 1983a). The spines in *Tylerius* are less restricted, extending dorsally from the level of the nostrils, to at least the dorsal fin, ventrally from the chin to the anal fin, and laterally, from the cheek to at least halfway along the caudal peduncle. This genus also has spines directly associated with the posterior extensions of the lateral lines.

Comparison of cranial osteology further highlights differences between *Amblyrhynchotes* and *Tylerius*. Both have the frontals broad across the interorbit, but whereas the frontals in *Tylerius* extend anteriorly well past the lateral projections of the prefrontals, to overlie most of the dorsal surface of the ethmoid, those in *Amblyrhynchotes* are considerably foreshortened, (Figs. 1 and 2). Tyler's (1980, fig. 265) illustration of *A. honckenii* shows the interorbital width of the frontals to be rather narrow—relatively less than that he illustrated for *Torquigener pleurogramma* (Tyler, 1980, fig. 266). Both this and the frontal length in head proportion given by Tyler for *A. honckenii* are contrary to my observations. The lateral projections of the prefrontal in *Amblyrhynchotes* are spade-like and flattened, whereas those in *Tylerius* are strongly downcurved.

The relatively small eye of *Amblyrhynchotes* is also reflected in the osteology. The prefrontal-sphenotic distance is relatively smaller in *Amblyrhynchotes* and the level of the parasphenoid considerably higher, than in *Tylerius*. The parasphenoid placement in *Amblyrhynchotes* is also determined by the antero-dorsal orientation of the mouth. The medial frontal-contacting extension of the parasphenoid is considerably broader in *Amblyrhynchotes*.

The branchial, axial and caudal skeletons are very similar in the two genera, and are essentially typical of tetraodontids (Tyler, 1980). Vertebral numbers overlap, there being 20 in *Tylerius* (from five specimens), and 20–21 in *Amblyrhynchotes* (from five specimens).

ACKNOWLEDGMENTS

I am grateful to Mr. A. C. Wheeler (BMNH), Mr. J. B. Hutchins (WAM), Dr. M. H. Walker (Department of Fisheries and Wildlife, Western Australia), and Mr. T. Gloerfelt-Tarp (FAO), for the loan or gifts of specimens on which this study is based. Dr. P. H. J. Castle (Victoria University of Wellington) kindly made available radiographic facilities. Drs. J. C. Tyler (National Science Foundation, Washington) and G. R. F. Hicks (National Museum of New Zealand) provided some helpful comments on the manuscript. Janet Atkinson did the illustrations.

LITERATURE CITED

- Annandale, N. and Jenkins, J. T. 1910. Report on the fishes taken by the Bengal fisheries steamer "Golden Crown." Part III. Plectognathi and Pediculati. Mem. Ind. Mus. 3: 7-21.
- Barnard, K. H. 1927. A monograph of the marine fishes of South Africa. Part II (Teleostei—Discocephali to end. Appendix). Ann. S. Afr. Mus. 21: 419-1065.
- Cheng Quingtai, Wang Cunxin, Tian Mincheng, Li Chunsheng, Wang Yugang and Wang Qi. 1975. Studies on the Chinese tetraodontid fishes of the genus *Fugu*. Act. Zool. Sin. 21: 359-378.
- Dekkers, W. J. 1975. Review of the asiatic freshwater puffers of the genus *Tetraodon* Linnaeus, 1758 (Pisces, Tetraodontiformes, Tetraodontidae) Bijdr. dierk. 45: 87-142.
- Fraser-Brunner, A. 1943. Notes on the Plectognath fishes VIII. The classification of the Suborder Tetraodontoidea, with a synopsis of the genera. Ann. Mag. Nat. Hist. Ser. 11 10: 1-18.
- Hardy, G. S. 1981a. New records of pufferfishes (Family Tetraodontidae) from Australia and New Zealand, with notes on *Sphoeroides pachygaster* (Müller and Troschell), and *Lagocephalus scleratus* (Gmelin). Rec. Nat. Mus. N.Z. 1: 311-316.
- . 1981b. A redescription of the pufferfish *Contusus richiei* (Fremenville) (Tetraodontidae: Plectognathi), and description of a second species of *Contusus*. N.Z. J. Zool. 8: 11-23.
- . 1982. Two new generic names for some Australian pufferfishes (Tetraodontiformes: Tetraodontidae) with species' redescrptions and osteological comparisons. Aust. Zool. 21: 1-26.
- . 1983a. Revision of Australian species of *Torquigener* Whitley (Tetraodontiformes: Tetraodontidae), and two new generic names for Australian pufferfishes. J. Roy. Soc. N.Z. 13: 1-48.
- . 1983b. The status of *Torquigener hypselogeneion* (Bleeker) (Tetraodontiformes: Tetraodontidae) and some related species, including a new species from Hawaii. Pac. Sci. 37: 65-74.
- Shipp, R. L. 1974. The pufferfishes (Tetraodontidae) of the Atlantic Ocean. Pub. Gulf Coast Res. Lab. Mus. 4: 1-162.
- Smith, J. L. B. 1961. The sea fishes of Southern Africa. 4th Ed. Central News Agency, South Africa. 580 pp.
- Tyler, J. C. 1964. A diagnosis of the two species of South American Puffer fishes (Tetraodontidae, Plectognathi) of the genus *Colomesus*. Proc. Acad. Nat. Sci. Phila. 16: 119-148.
- . 1980. Osteology, phylogeny, and higher classification of the fishes of the Order Plectognathi (Tetraodontiformes). NOAA Tech. Rep. NMFS Circ. 434: 1-422.

DATE ACCEPTED: March 31, 1983.

ADDRESS: National Museum of New Zealand, Private Bag, Wellington, New Zealand.